SHORT COMMUNICATION

TWO PREVIOUSLY UNREPORTED BEHAVIOURS OF *HEMIGRAPSUS CRENULATUS* MILNE-EDWARDS (BRACHYURA: GRAPSIDAE) FROM NEW ZEALAND

T. MATHESON

Department of Zoology, University of Canterbury,
Christchurch 1, New Zealand.

(Received June, 1988; revised and accepted July, 1988)

SUMMARY

Matheson, T. (1988). Two previously unreported behaviours of *Hemigrapsus crenulatus* Milne-Edwards (Brachyura: Grapsidae) from New Zealand. *New Zealand Natural Sciences* 15: 91 - 92.

Behaviours of *Hemigrapsus crenulatus* were recorded both in the laboratory and in the field. Two behaviours previously undescribed in this genus are reported: antenna wiping is a rapid up and down movement of the palps of the maxillipeds which may serve to clean the antennae; bunch is a posture assumed by some animals when disturbed. While bunching, all the legs and both chelae are held tightly flexed under the body, and the crab remains motionless. This behaviour may serve to protect the ventral surface, especially that of females carrying eggs.

KEYWORDS: Brachyura - crab - *Hemigrapsus crenulatus* - behaviour.

INTRODUCTION

If ethological comparisons are to be accurate, complete behavioural repertoires of the species of interest must be available. Failure to record a behaviour, or insufficient description of its form may lead to false conclusions regarding the similarities or differences between populations or species.

Behaviours of *Hemigrapsus* species have previously been described from North American (Jacoby 1981, Lindberg 1980) and New Zealand (Jones 1976) populations. The present study of a New Zealand population of *H. crenulatus* helps to provide a more comprehensive description of the genus by revealing two behaviours (antenna wiping, and bunching) which are not included in earlier reports.

MATERIALS AND METHODS

Crabs from the Avon-Heathcote Estuary, Christchurch, New Zealand were studied over a 5 month period (April - August) in 1986. Animals were held in a recirculating seawater system at 16°C under a 11:13 light/dark regime. Tanks contained up to 30 individuals at approximately natural densities. The ratio of males to females reflected that in the estuarine population. Behaviours were videotaped for subsequent description and analysis.

RESULTS AND DISCUSSION

BUNCH

Bunch consisted of maximal flexion of all legs and both chelae under the body in response to strong mechanical disturbance, or to the disturbance and exposure to light which resulted from lifting rocks from over crab's burrows. The tips of the appendages met medially with the merus-carpus joints touching the lateral margins of the carapace, and the dactyli tightly pressed to the ventral body surface. The tips of the chelae lay posterior to the mouth. Crabs often remained completely motionless in this position

for up to approximately 1 minute.

Bunch appears to be primarily defensive because it is elicited by sudden disturbance or strong vibrations. This posture should protect the ventral body surface, especially the eggs of berried females, from mechanical damage and predation. A study comparing the occurrence of this behaviour in berried and non-berried females is in progress. The full flexion of all the appendages disguises the characteristic outline of the crab, which, together with complete immobility may aid crypsis. This function has also been attributed to the similar 'flexion' behaviour of *Notomithrax ursus* (Pack 1982). In *Heterozius rotundifrons* bunching is elicited by disequilibrium, but not by sudden light or shadow (L.H. Field pers. comm.). Active *H. crenulatus* only bunch after prolonged vigorous disturbance; this behaviour thus appears to be more important for partially hidden individuals, where escape movements could attract a predators' attention.

ANTENNA WIPE

Submerged crabs of both sexes, especially if feeding, periodically extended the palps of their third maxillae and scraped these down over the first antennae in a movement lasting on average 0.69 s (0.44-1.0 s, n = 39). In 38 of 39 measured cases the movement was bilateral. If one palp began the movement after the other, the leading palp often paused at maximum flexion, allowing the movement to be completed with the palps in unison.

Antenna wipe began with a spreading apart of the maxillae as the palps began to extend. At maximum extension, the palps pointed vertically up, lateral to the antennae. The gap between the ishiopodites of the maxillae was 2-3 mm. The distal joints of each palp began to flex, drawing the tip in an arc around and above the ipsilateral antenna. Further flexion at these joints and flexion at the merus-carpus joint combined to draw the palp down across the antenna as the ishiopodites began to close. The palps returned to their folded rest position just as the maxillae occluded.

During the scraping phase of this behaviour the antennae extended forwards and down from their usual position (flexed 90° at the distal joint with the tips lying adjacent to, or above the anterior carapace).

Antenna wiping was not reported for *H. nudus* (Jacoby 1981) or *H. oregonensis* (Lindberg 1980), although I suspect that these authors failed to distinguish the movement from eye wiping, which in *H. crenulatus* at least, is similar in form to antennae wiping, but 0.3 s slower on average (23 eyewipes, 39 antenna wipes from 5 crabs). This difference is significant (t = 3.43, P < 0.02, df = 4).

Eye wiping was performed unilaterally more often than was antenna wiping (X^2 = 5.78, P < 0.02, df = 1). This may enhance the continuity of visual input, since one eye may remain erect throughout a unilateral eye wipe. Both eyes remain erect throughout antenna wiping.

Antenna wiping may serve to remove particles from the antennae, and would thus reduce the possibility of adhering particles masking chemical stimuli. The existence of a specific behaviour for cleaning the antennae stresses the relative importance of these sensory structures compared to other chemoreceptors on the crab's legs and body.

ACKNOWLEDGEMENTS

Many thanks to Larry Field, who made valuable comments on the manuscript, and to Helen Lloyd for encouragement at all stages of the work.

REFERENCES

Jacoby, C. A. (1981). Behaviour of the purple shore crab *Hemigrapsus nudus* Dana, 1851. *Journal of Crustacean Biology* 1: 531-544.

Jones, M. B. (1976). Limiting factors in the distribution of intertidal crabs (Crustacea: Decapoda) in the Avon-Heathcote Estuary, Christchurch. *New Zealand Journal of Marine and Freshwater Research* 10: 577-587.

Lindberg, W. J. (1980). Behaviour of the Oregon mud crab, *Hemigrapsus oregonensis* (Dana) (Brachyura, Grapsidae). *Crustaceana* 39(3): 263-281.

Pack, Y. M. (1982). Masking behaviour and related biology of *Notomithrax ursus* (Oxyrhyncha: Majidae). Ph.D. Thesis, University of Canterbury, New Zealand.